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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,419	02/10/2004	Ashish Tiwari	SRI 4840-2	9732
48318	7590	08/18/2008		
DEBORAH NEVILLE P.O. BOX 61063 PALO ALTO, CA 94306			EXAMINER PIERRE LOUIS, ANDRE	
			ART UNIT 2123	PAPER NUMBER
			MAIL DATE 08/18/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/775,419

**Applicant(s)**

TIWARI ET AL.

**Examiner**

ANDRE PIERRE LOUIS

**Art Unit**

2123

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 and 5-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date \_\_\_\_\_

**10DETAILED ACTION**

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/25/2008 has been entered.
2. Claim 4 is cancelled; and claims 1-3, and 5-9 are pending and presented for examination.
3. Regarding the objection, the Examiner withdraws the objection in view of the amendment.

**Response to Arguments**

4. Applicant's arguments filed 12/27/2007 have been fully considered but they are not moot in view of the new grounds of rejections.

**Claim Rejections - 35 USC § 102**

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

- 5.0 Claims 1-3, 5-7 are rejected under 35 U.S.C. 102 (b) as being anticipated by Tiwari ET al. (Series of Abstraction for Hybrid Automata, pages 465-478, 2/4/2002).

5.1 In considering claims 1 and 5, Tiwari et al. discloses a method of constructing an abstract discrete system suitable for formal analysis from a hybrid system, with respect to a property of interest, wherein at least one of the property of interest and a guard of a mode change

transition of the hybrid system comprise at least one polynomial, said method comprising the steps of: a) selecting an initial set of polynomials from the polynomials contained in one or both of the property of interest and the guards of the mode change transitions of the hybrid system (*pg.469-470*); b) saturating the selected set of polynomials, by repeatedly choosing a polynomial from the selected set of polynomials and adding a time derivative of the chosen polynomial to the set unless the time derivative is a constant or a constant multiple of a polynomial already in the set; (*phase I, pgs. 469-474*) c) constructing the abstract discrete system over a set of abstract states defined by the positive, negative and zero valuation of the saturated set of polynomials (*phase II, pgs. 470-474*); d) storing the abstract discrete system (*pg.469-474*).

5.2 As per claim 2, Tiwari et al. discloses that the step of saturating the selected set of polynomials is stopped before normal termination (*see pg.469-470, 474*).

5.3 As per claim 3, Tiwari et al. discloses that the hybrid system has no discrete components (*see pg. 467*).

5.4 Regarding claim 6, Tiwari et al. discloses that the property of interest is invalid with respect to the abstract discrete system, creating a finer abstraction of the hybrid system and analyzing the property of interest with respect to the finer abstraction (*see pgs.466, 472-473*).

5.5 As per claim 7, Tiwari et al. discloses that analyzing the validity of the property of interest is performed by model checking (*see pgs.466-467*).

**Claim Rejections - 35 USC § 103**

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(c), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1 and 5 are further rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh et al. (IEEE 1998, Model abstraction for formal verification), Tiwari ET al. (Series of Abstraction for Hybrid Automata, pages 465-478, 2/4/2002).

6.1 In considering claims 1 and 5, Hsieh et al. substantially teaches a method of constructing an abstract discrete system suitable for formal analysis from a hybrid system, with respect to a property of interest, wherein at least one of the property of interest and a guard of a mode change transition of the hybrid system comprise at least one polynomial, said method comprising the steps of: a) selecting an initial set of polynomials from the polynomials contained in one or both of the property of interest and the guards of the mode change transitions of the (pg.140-143); c) constructing the abstract discrete system over a set of abstract states defined by the positive, negative and zero valuation of the saturated set of polynomials (pg.140-143); d) storing the abstract discrete system (pg.145). However, Hsieh et al. does not expressly teach the step of b) saturating the selected set of polynomials, by repeatedly choosing a polynomial from the selected set of polynomials and adding a time derivative of the chosen polynomial to the set unless the time derivative is a constant or a constant multiple of a polynomial already in the set; but Tiwari et al. teaches a step of saturating the set of polynomials, by repeatedly choosing a polynomial from the selected set of polynomials and adding a time derivative of the chosen

polynomial to the set unless the time derivative is a constant or a constant multiple of a polynomial already in the set (*pg.469-474*). Hsieh et al. further teaches analyzing the validity of the property of interest with respect to the abstract discrete system (*see Hsieh et al. pg.140-141*); outputting the validity of the property of interest (*see Hsieh et al. pg.144*) and Tiwari et al. further teaches constructing an abstract discrete model (*see pg.470-474*). Hsieh et al. and Tiwari et al. are analogous art because they from the same field of endeavor and that the techniques disclose by Tiwari et al. is similar to that of Hsieh et al. Therefore, it would been obvious to one ordinary skilled in the art to combine the model abstraction of Tiwari et al. with the model checking system of Hsieh et al. because Tiwari et al. teaches the advantage of using the SAL tool that is used to construct finer abstractions of hybrid system (*pg.474*).

7. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tiwari ET al. (Series of Abstraction for Hybrid Automata, pages 465-478, 2/4/2002), as applied to claims 1-3, and 5-7 above, in view of Lincoln et al. (USPG\_PUB No. 2003/0033126).

7.1 Regarding claims 8-9, Tiwari et al. teaches most of the instant invention; however, he does not expressly teach that the hybrid system is a model of a biological system. Lincoln et al. substantially teaches that the hybrid system is a model of a biological system (*see Title*). Lincoln et al. and Tiwari et al. are analogous art because they are from the same field of endeavor and that the model analyses by Lincoln et al. is similar to that of Tiwari et al. Therefore, it would have been obvious to one ordinary skilled in the art at the time of the applicant's invention to combine the biological system modeling of Lincoln et al. with the model abstraction system of Tiwari et al. because Lincoln teaches the advantage of decision diagram for efficiency manipulation and representation and the improvement of efficiency (*para 0090*), and

Vangheluwe teaches advantage of achieving tremendous flexibilities (*pg. 170*), and many other advantages can be found on *page 93-94*.

**Conclusion**

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

8.1 Wang et al., (Formal Property Verification by Abstraction Refinement with formal, Simulation and Hybrid System Engines, 2001).

9. Claims 1-3, 5-9 are rejected and **THIS ACTION IS NON-FINAL**. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andre Pierre-Louis whose telephone number is 571-272-8636. The examiner can normally be reached on Mon-Fri, 8:00AM-4:30PM Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul L. Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2123

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. P. L/

Examiner, Art Unit 2123

August 11, 2008

/Zoila E. Cabrera/

Primary Examiner, Art Unit 2123